

### Claims

What is claimed is:

1. A method of forming a ferroelectric capacitor comprising forming a  
5 crystalline PZT layer by a process including the steps of:  
  
    depositing a layer of amorphous ferroelectric material over a layer of a  
    first material;  
  
    etching the ferroelectric layer to form isolated ferroelectric elements;  
  
    providing a layer of a second material on at least the side surfaces of  
10 the ferroelectric elements; and  
  
    performing an annealing step to crystallize the ferroelectric material;  
  
    the second material promoting crystallisation of the ferroelectric  
    material to a higher degree than the first material; whereby the crystallisation  
    proceeds horizontally through the ferroelectric elements.
- 15 2. A method according to claim 1 in which, prior to the annealing step, the  
    ferroelectric elements are directly covered with a layer of a material which  
    promotes crystallisation of the ferroelectric material to a lesser degree than  
    the second material.
3. A method according to claim 1 in which the second material is  $\text{TiO}_2$ .
- 20 4. A method according to claim 3 in which the  $\text{TiO}_2$  is formed by  
    depositing Ti on at least the side surfaces of the ferroelectric elements, and  
    oxidising the Ti to form  $\text{TiO}_2$ .
5. A method according to claim 4 in which the Ti is oxidised to  $\text{TiO}_2$  by  
    chemical reaction with the ferroelectric material.

6. A ferroelectric device including a ferroelectric capacitor produced by a method according to claim 1.
7. A method according to claim 1 further including depositing electrode elements of conductive material between the ferroelectric elements.
- 5 8. A method according to claim 1 in which the ferroelectric material is PZT.
9. A ferroelectric capacitor produced by a method according to claim 1.
10. A FeRAM memory device including a ferroelectric capacitor produced by a method according to claim 1.
- 10 11. A ferroelectric capacitor comprising:
  - a substrate having an upper surface;
  - crystalline ferroelectric elements formed over the substrate; and
  - electrical contacts on the sides of the ferroelectric elements;
  - the crystal boundaries of the ferroelectric elements extending
  - 15 substantially parallel to the surface of the substrate.
12. A FeRAM memory device including a ferroelectric capacitor according to claim 11.